chamber can be freely set according to the environment in which the ICs will be used.

WHAT IS CLAIMED IS:

1. A part transfer apparatus characterized by comprising:

a plurality of drive shafts coaxially disposed, each having a drive system connected to one end and rotationally driven by the drive system; and

a plurality of holding and transfer mechanisms respectively mounted to the plural drive shafts and having a holding device for holding a part.

2. A part transfer apparatus characterized by comprising:

a first drive shaft and a second drive shaft coaxially disposed, each having a drive system connected to one end and rotationally driven by the drive system;

a first holding and transfer mechanism mounted to the first drive shaft and having a first holding device for holding a part; and

a second holding and transfer mechanism mounted to the second drive shaft and having a second holding device for holding a part.

3. A part transfer apparatus as described in claim 2, characterized by the second drive shaft being hollow and the first drive shaft passing through and disposed coaxially to the second drive shaft.

4. A part transfer apparatus as described in claim 3, characterized by one end on the drive system side of the first drive shaft and second drive shaft being axially supported by a bearing, and a spacer for maintaining a space between the drive shafts being disposed at the other end in the space between the first drive shaft and second drive shaft.

5. A part transfer apparatus as described in any of claims 2 to 4, characterized by the first holding and transfer mechanism being mounted to the first drive shaft so that the holding surface of the first holding device is at an angle of 45 degrees to the drive shaft, and the second holding and transfer mechanism being mounted to the second drive shaft so that the holding surface of the second holding device is at an angle of 45 degrees to the drive shaft.

6. A part transfer apparatus as described in any of claims 2 to 5, characterized by the first holding and transfer mechanism having a first support mechanism for slidably supporting the first holding device in a direction perpendicular to its holding surface, and the second holding and transfer mechanism having a second support mechanism for slidably supporting the second holding device in a direction perpendicular to its holding surface.

7. A part transfer apparatus as described in claim 6, characterized by the first holding and transfer mechanism being mounted to the first drive shaft connecting the first drive shaft and the first support mechanism, and the second holding and transfer mechanism being mounted to the second drive shaft connecting the second drive shaft and the second support mechanism.

8. A part transfer apparatus as described in any of claims 2 to 7, characterized by alternately moving the first holding and transfer mechanism and the second holding and transfer mechanism by rotation of each drive shaft to a supply transfer unit for supplying parts and a process unit for applying a specific process to the parts.

9. A part transfer apparatus as described in claim 8, characterized by the first holding and transfer mechanism and the second holding and transfer mechanism ejecting parts finished processing in the processing unit to an ejection transfer unit by rotation of each drive shaft.

10. A part transfer apparatus as described in any of claims 2 to 9, characterized by the first holding device and the second holding device each comprising multiple holding heads.

11. A part transfer apparatus as described in claim 10, characterized by the holding heads having a vacuum chucking means for vacuum chucking parts.

12. A part transfer apparatus as described in claim 11, characterized by the multiple holding heads being arranged in line.

13. A part transfer apparatus as described in claim 11, characterized by the multiple holding heads being arranged in a matrix.

14. A part transfer apparatus as described in claim 8 or claim 9, characterized by the process unit performing electrical characteristics tests on the part as the specific process.

15. A control method for a part transfer apparatus, characterized by independently driving the first drive shaft and second drive shaft in a part transfer apparatus as described in any of claims 2 to 13.

16. A control method for a part transfer apparatus, characterized by causing the second holding and transfer mechanism holding an unprocessed part picked up at the supply

transfer unit to wait at a standby position by means of rotating the second drive shaft while the first holding and transfer mechanism is positioned at the process unit in a part transfer apparatus as described in claim 8 or claim 9.

17. A control method for a part transfer apparatus as described in claim 16, characterized by the standby position being specified as a position in a plane perpendicular to the drive shaft at an angle of 180 degrees or less to the process unit around the drive shaft.

18. A control method for a part transfer apparatus as described in claim 16 or claim 17, characterized by the standby position being set at a proximal position where there is no mutual interference between the first holding device and second holding device.

19. A control method for a part transfer apparatus as described in any of claims 16 to 18, characterized by alternately changing the rotational direction of each drive shaft when a part is transferred from the supply transfer unit to the process unit.

20. A control method for a part transfer apparatus as described in any of claims 16 to 18, characterized by setting the rotational direction of each drive shaft when a part is transferred from the supply transfer unit to the process unit to the same direction.

21. A control method for a part transfer apparatus as described in any of claims 16 to 20, characterized by causing the first holding and transfer mechanism and second holding and transfer mechanism to wait at a standby position after picking up at the supply transfer unit after ejecting a processed part at the ejection transfer unit.

22. A control method for a part transfer apparatus as described in any of claims 16 to 21, characterized by the part being an IC and the process unit performing electrical characteristics tests on the IC as the specific process.

23. In an IC test method for performing electrical characteristics tests of ICs under a specified temperature environment, an IC test method characterized by:

a supply step for supplying an untested IC;

a test step for testing electrical characteristics of the untested IC;

an ejection step for ejecting a tested IC; and

transferring the IC between a supply position for supplying untested ICs, a process position for testing electrical characteristics of the untested ICs, and an ejection position for ejecting tested ICs using a part transfer apparatus as described in any of claims 1 to 14.

24. An IC test method as described in claim 23, characterized by further comprising a temperature control step for temperature adjusting untested ICs under a specific temperature environment, the temperature control step adjusting the untested ICs to a specific temperature environment by cyclically moving trays in a chamber held to a specific internal temperature environment and storing a plurality of trays storing a plurality of untested ICs.

25. An IC handler having a part transfer apparatus as described in any of claims 1 to 14, said part being an IC, for transferring ICs to the process unit for electrical characteristics testing of the ICs,

the IC handler comprising a supply unit, a supply mechanism, a supply shuttle, a transfer mechanism, an ejection shuttle, an ejection unit, and an ejection mechanism, and characterized by:

the part transfer apparatus comprising a supply transfer unit, the supply transfer unit configured with a plurality of trays for transferring untested ICs to the holding and transfer mechanism;

the supply unit having a plurality of supply trays storing a plurality of untested ICs;

the supply mechanism comprising a supply suction mechanism for vacuum chucking an IC, a planar movement mechanism for moving the supply suction mechanism in a planar direction, and an elevator mechanism for moving the supply suction mechanism in a direction perpendicular to this plane, and removing untested ICs from the supply tray in the supply unit and supplying untested ICs to the supply shuttle by moving the supply suction mechanism by means of the planar movement mechanism and elevator mechanism;

the supply shuttle performing above the supply transfer unit an operation for receiving untested ICs removed from the supply tray by the supply suction mechanism of the supply mechanism at a first untested IC receiving position from the supply suction mechanism, then moving to a first untested IC transfer position for transferring the untested ICs to the supply transfer unit of the part transfer apparatus, and returning to the first untested IC receiving position when the transfer is completed;

the transfer mechanism comprising a transfer suction mechanism able to move up and down, and configured to vacuum chuck an untested IC from the supply shuttle positioned at the first untested IC transfer position and rise, then descend, and transfer the untested IC to a tray of the supply transfer unit appearing directly thereunder by means of the supply shuttle moving to the first untested IC receiving position, by means of the transfer suction mechanism;

the supply transfer unit being configured to sequentially cycle a plurality of trays by positioning the multiple trays one at a time to a second untested IC receiving position positioned

directly below the first untested IC transfer position, and to a second untested IC transfer position for transferring untested ICs to the holding and transfer mechanism,

moving an empty tray to the second untested IC receiving position after transferring untested ICs to the holding and transfer mechanism at the second untested IC transfer position, and moving a tray holding untested ICs to be tested next to the second untested IC transfer position;

the ejection shuttle being configured to perform above the supply transfer unit an operation for receiving at a tested IC receiving position located directly above the second untested IC transfer position tested ICs processed by the process unit and removed from a tray of the supply transfer unit by the holding and transfer mechanism, then moving to a tested IC transfer position for transferring the tested ICs to the ejection mechanism, and when transfer is completed returning to the tested IC receiving position;

the ejection unit comprising a plurality of ejection trays for holding a plurality of tested ICs and configured to store tested ICs in groups according to test results at the process unit; and

the ejection mechanism comprising an ejection suction mechanism for vacuum chucking ICs, a planar movement mechanism for moving the ejection suction mechanism in a planar direction, and an elevator mechanism for moving the ejection suction mechanism in a direction perpendicular to this plane, and configured to remove a tested IC from the ejection shuttle positioned at the tested IC transfer position and eject the tested IC to an ejection tray of the ejection unit according to test results in the process unit by moving the ejection suction mechanism by means of the horizontal movement mechanism and elevator mechanism.

26. An IC handler as described in claim 25, characterized by comprising a chamber internally housing the supply transfer unit and maintaining a specific internal temperature environment, and

bringing the untested ICs to the specific temperature by means of the chamber while held in the plural trays of the supply transfer unit.

27. An IC handler as described in claim 26, characterized by further comprising a hot plate for heating tested ICs to normal temperature before ejection to the ejection unit.

28. An IC handler as described in any of claims 25 to 27, characterized by the transfer mechanism being disposed directly above the first untested IC transfer position.

29. An IC test apparatus characterized by comprising a test head having the process unit, a tester connected to the test head and running an IC electrical characteristics test in the process unit, and an IC handler as described in any of claims 25 to 28 for transferring ICs to the process unit.